OFFICIAL RESPONSE

with the help of the control equipment 12 consisting of, for example, hydraulic maneuvering means which are controlled by the unit 20.

Please replace the paragraph starting on page 19, line 16 with the following:

These measurement sequences are repeated during the machine's scraper work, whereby the machine operator the whole time during the working progress obtains instantaneous data concerning the scraper blade's position, alignment, direction of displacement and speed in the fixed coordinate system, and consequently obtains an extremely good idea of how the work is progressing compared to the desired ground preparation, and how the machine is to be maneuvered.

IN THE CLAIMS

The entire presently pending set of claims is presented herein for the convenience of the Examiner. Amended claims are indicated as such in the parenthetical following the claim number. Further, enclosed herewith is a separate paper entitled "Version With Markings To Show Changes Made" which corresponds to the amendments to the claims made herein.

Please amend claims 1-26.

Please also add the new claims 27-31.

1. (Amended) A system for determining the position of a working part of a tool on a working machine comprising:

a position-determining apparatus comprising:

at least one detector equipment placed generally at a designated place on the working machine spaced from the working part and adapted to enable the determination of the position of the designated place in a fixed coordinate system; and

OFFICIAL RESPONSE

an inclination- and orientation-measuring device adapted to enable the determination of the orientation of the designated place on the working machine in the fixed coordinate system,

at least one position relationship device adapted to enable the determination of a positional relationship of the working part of the tool relative to the designated place on the working machine in a machine-based coordinate system;

a calculating device adapted receive measurements from the position-determining apparatus in the fixed coordinate system and measurements from the at least one position relationship device in the machine-based coordinate system to provide at least one of the position of the working part of the tool in the fixed coordinate system and the orientation of the working part of the tool in the fixed coordinate system.

2. (Amended) The system according to claim 1, wherein:

the at least one detector equipment comprises at least one detector unit fixedly placed on the working machine; and

the inclination- and orientation-measuring device comprises a north-seeking unit adapted to instantaneously sense the direction of the working machine in relation to north.

3. (Amended) The system according to claim 1 wherein:

the position-determining apparatus further comprises a stationary measuring station placed in the vicinity of the working machine, the stationary measuring station operatively configured to determine the position of the working machine in cooperation with the detector equipment; and

the at least one detector equipment comprises at least two detector units placed at the designated place on the working machine arranged in fixed positions relative to the working machine, said at least two detectors arranged to cooperate with the stationary measuring station to give the orientation in space for the designated place on the working machine.

OFFICIAL RESPONSE

4. (Amended) The system according to claim 28, characterized in that the detector unit is rotatable around an axis placed at a distance therefrom, said device further configured such that measurement towards the detector unit is indicated when the detector unit reaches determined angular positions around the axis in relation to the working machine.

5. (Amended) The system according to claim 1, characterized by at least one rotatably mounted and controllable optical unit placed on the working machine adapted to align towards a stationary measuring station such that the orientation of the optical unit relative to the working machine is indicated and transmitted to the calculating device for determination of the orientation of the working machine in the fixed coordinate system.

6.(Twice Amended) The system according to claim 1, characterized in that each of the at least one detector equipment comprises at least one radio navigation antenna with a corresponding receiver.

7. (Twice Amended) The system according to claim 1, characterized in that the position-determining apparatus comprises a geodesic instrument with target-seeking function placed at a distance from the working machine and measuring against at least one target on the working machine.

8. (Amended) The system according to claim 7, characterized in that each respective target is provided with an alignment indicator adapted to provide alignment indications for the geodesic instrument concerning the respective target towards which instantaneous target-seeking is to be made and for measuring towards the respective target.

9. (Twice Amended) The system according to claim 1, characterized in that the calculating device comprises:

OFFICIAL RESPONSE

a stored map with a desired topography of an area which is to be treated;

calculated data for the working part configured to provide position and angular positions relative to the map; and

a presentation unit configured to present the map and calculated data.

10. (Twice Amended) The system according to claim 1, characterized in that the position-determining apparatus comprises a relatively slow, accurate determining device which at time intervals accurately measures the actual position and orientation of the working machine, and a relatively fast determining device which reacts on at least one of position and orientation differences to at least one earlier determination in order to calculate and update the determination between the said time intervals.

11. (Amended) The system according to claim 10, characterized in that the relatively fast determining device comprises at least one accelerometer device on the working machine adapted to measure the acceleration of the machine in at least one direction, and the calculating unit is further configured to integrate the indicated acceleration(s) and update the latest calculation result of the position of the working part in the fixed coordinate system.

12. (Amended) The system according to claim 10, characterized in that the relatively fast determining device comprises at least one rotation-indicating device for rotation around at least one axis of the machine.

13. (Twice Amended) The system according to claim 1, characterized in that the calculating unit uses earlier calculation results to calculate a probable position, orientation, direction of work and speed a certain time in advance for the working part of the working machine.

OFFICIAL RESPONSE

14. (Amended) A method for determining the position of a working part of a tool on a working machine comprising:

measuring both a position and an orientation of a designated place on the working machine spaced from the working part and in a fixed coordinate system;

determining a positional relationship of the working part relative to the designated place in a machine-based coordinate system; and

calculating in the fixed coordinate system, at least one of an instantaneous position of the working part and an instantaneous orientation of the working part based upon the measured position and orientation of the designated place of the working machine and the positional relationship of the working part relative to the designated place.

15. (Amended) The method according to claim 14, further comprising fixedly placing at least one detector unit and a north-seeking unit on the working machine for instantaneous sensing of the direction of the working machine in relation to north.

16. (Amended) The method according to claim 14, wherein the act of measuring the position of the designated place on the working machine comprises:

utilizing a stationary measuring station placed in the vicinity of the working machine adapted to cooperate with a detector device; and

providing at least two detector units placed at the designated place on the working machine arranged in fixed positions relative to the working machine, said at least two detectors arranged to cooperate with the stationary measuring station to give the orientation in space for the designated place on the working machine.

17. (Amended) The method according to claim 31, further comprising:

rotating the detector unit around an axis placed at a distance therefrom; and

measuring against the detector unit when the detector unit takes up determinable angular positions around the axis in relation to the working machine.

18. (Amended) The method according to claim 14, further comprising:

rotatably mounting at least one controllable optical unit on the working machine;

aligning the optical unit to the stationary measuring station;

indicating the orientation of the optical unit in relation to the working machine; and

calculating the orientation of the working machine in the fixed coordinate system.

19. (Twice Amended) The method according to claim 14, characterized in that the measuring of both position and orientation is performed with the help of at least one radio navigation antenna with a corresponding receiver.

20. (Twice Amended) The method according to claim 14, characterized in that the measuring of both position and orientation comprises:

providing a geodesic instrument with target-seeking function placed at a distance from the working machine; and

measuring against at least one target on the working machine.

21. (Amended) The method according to claim 20, further comprising providing direction-indication for the geodesic instrument as to an associated target towards which instantaneous target seeking is to be performed for measuring against the associated target.

22. (Twice Amended) The method according to claim 14, characterized by storing a map with desired topography of a region which is to be processed in a calculating device, calculating data for the working part and presentation thereof as position and angular positions relative to the map on a presentation unit.

OFFICIAL RESPONSE

23. (Twice Amended) The method according to claim 14, characterized in that the position and orientation determination is performed comprising a relatively slow determination in order to measure, at time intervals, at least one of the actual position of the working machine and the orientation of the working machine, and a relatively fast determination which reacts to at least one of position and orientation differences relative to earlier determination(s) in order to calculate and update the determination between the said time intervals.

24. (Amended) The method according to claim 23, wherein the relatively fast determination comprises:

acceleration-measuring in at least one direction;

integrating the indicated acceleration(s); and

updating the latest calculation result of at least one of the position and the orientation in the fixed coordinate system.

25. (Amended) The method according to claim 23, characterized in that, at the relatively fast determination, at least one rotation-indication is performed for rotation around at least one axis of the machine.

26. (Twice Amended) The method according to claim 14, characterized by calculation, with the help of earlier calculation results, of a probable position, orientation, working direction and speed a certain time in advance for the working part of the working machine.

Please add the following new claims.

27. (New) The system according to claim 2, wherein the north-seeking unit comprises a select one of a north-seeking gyroscope and an electronically readable compass.

28. (New) The system according to claim 1, wherein:

the position-determining apparatus further comprises a stationary measuring station placed in the vicinity of the working machine, the stationary measuring station operatively configured to determine the position of the working machine in cooperation with the detector equipment; and

the at least one detector equipment comprises at least one movable detector unit movable between positions with determinable positions in relation to the working machine.

29. (New) The system according to claim 5, wherein:

a select one optical unit is adapted to be aligned towards the stationary measuring station at least in part using a chosen beam selected from the group consisting of the measuring beam of the stationary measuring station, a beam parallel with the measuring beam of the stationary measuring station, and a beam transmitted from the optical unit and reflected in a prism in the stationary measuring station.

30. (New) The method according to claim 15, wherein the north-seeking unit comprises a select one of a north-seeking gyroscope and an electronically readable compass.

31. (New) The method according to claim 14, wherein the act of measuring instantaneously the position of the designated place on the working machine comprises:

utilizing a stationary measuring station placed in the vicinity of the working machine

OFFICIAL RESPONSE

adapted to cooperate with a detector device and

providing at least one movable detector unit movable between positions with determinable positions in relation to the working machine.